Engineering Review of Proposed Modified Alternative D Smithwick to Wall

[THIS PAGE INTENTIONALLY LEFT BLANK]

Burns & McDonnell
SINCE 1898

Date: July 17, 2001

To: Steve Thornhill

From: Randy Sedlacek

Re. Finance Docket No. 33407, Powder River Basin Expansion Project
Project 24554
Engineering Review of Proposed Modified Alternative D - Smithwick to Wall

I have reviewed Ray Gigear's June 28, 2001 letter to you and the attached documents and have the following comments.

1. The horizontal and vertical alignments prepared by DM&E for the Modified D alternative route between Smithwick and Wall via a bypass of Rapid City appear to meet the criteria of modifying the existing alignment to maximum 1.0 percent grades and compensated 1.0 degree curves. The new alignment between the existing track south of Rapid City and the existing track east of Rapid City also appears to meet the criteria.
2. The horizontal and vertical alignments prepared for the proposed Modified D Alternative appear to represent a good faith and credible effort to develop an alternative rail alignment through this area meeting the design criteria noted in Item No. 1.
3. The earthwork for the resulting alignment is very unbalanced with a very large amount of excavation on the section from Smithwick to Rapid City and mostly fill on the section from Rapid City to Wall.
4. The amount of excavation is about three times the amount of fill, which will require large areas for the disposal of excess fill as it is unlikely a local or regional need could be identified for such a large quantity of fill and it is generally uneconomical to transport fill material for more than a few miles.
5. The earthwork quantities developed as part of the horizontal and vertical alignment appear to represent a credible estimate of the cut and fill that would be associated with the proposed Modified D alignment. However, the amount of excavation is probably understated, as it does not include any benching for the deep excavations (in excess of 100 feet). Benching of sideslopes (essentially stair-stepping from the bottom of the cut to the top) would be necessary to provide stable sideslopes, reduce the potential for erosion, and provide for drainage of runoff draining into the cut. Excavation also is based on a typical, or standard, rail ditch cross section (similar to the figures presented in Chapter 1 of the Draft EIS and typically used to conduct preliminary engineering analysis), that for some sections, such as where creeks would have to be rerouted into the cut, would have to be larger. Practical considerations such as snow removal may also call for larger ditches. Also no cut or fill was included for existing road alignment changes required to maintain crossings with the revised track

alignment. That is, roads crossing the proposed rail alignment may require reconstruction, including fill or excavation, to either bring them to the same elevation as the rail line at the crossing or create sufficient elevational difference to allow for construction of a grade separated crossing.

6. The new alignment section of track includes crossing state highway 44. The track elevation at the highway crossing is about 10 feet above grade so the existing highway profile would have to be modified and/or a grade crossing constructed.
7. The revised alignment would require replacement of existing bridges and other drainage structures. The bridge crossing the Cheyenne River between Mile Post 44 and Mile Post 45 would have to be about 40 feet taller than the existing structure. Likewise the bridge crossing the Cheyenne River near Mile Post 602 would have to be 50-60 feet taller. Crossing rivers and streams requires a bridge or culvert, with fill placed on either side of the crossing structure. Minimizing the actual bridge length (and subsequently the cost because bridging is more expensive per foot than filling) would require a large fill area footprint in the flood plain. Like the existing alignment, there would be many smaller structures required for streams crossing back and forth under the track which would have to be raised or lowered to account for the new gradeline.
8. At numerous locations the excavation for the revised alignment cuts off creeks that cross the track, resulting in the cut being lower than the creek and the creek flow draining into the cut. In some instances the creek flow only has to be conveyed a short distance in the track side ditch until the creek crosses back under the track and the flow can be returned to the creek channel. There are also several instances where the depth of cut requires quite long distances (several miles) of trackside ditch flow before the creek water can be discharged back to the existing surface/channel drainage. Most of these interruptions in channel flow only impact the hydrology of a narrow area along the track alignment but potentially much of this narrow area could be wetland. Additionally, these sections of stream would effectively be de-watered, impacting stream wetlands, water for livestock, and the ability to use stream water for irrigation.

Overall the modified Alternative D route is probably technically feasible but not reasonable or practical considering Alternative D provides no advantages such as reducing travel distance and other alternatives are available with significantly less impact and cost.

Pierre - Highway 14 Grade Separation

[THIS PAGE INTENTIONALLY LEFT BLANK]

Burns & McDonnell
SINCE 1898

Date: September 30, 2001

To: Steve Thornhill

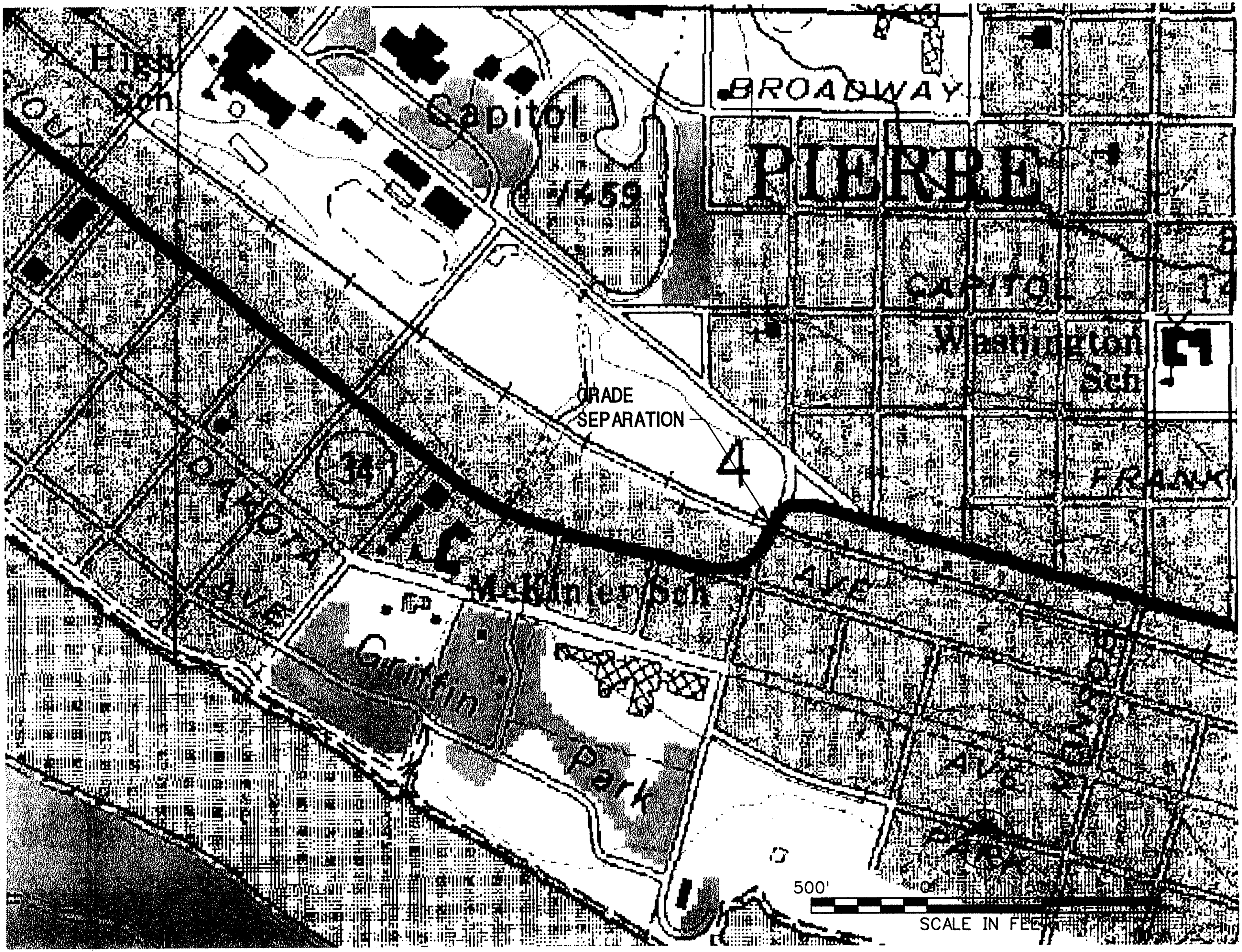
From: Randy Sedlacek

Re. STB - DM&E
Project 24554
Pierre – Highway 14 Grade Separation

A grade separation at the Highway 14 crossing could be constructed using the existing horizontal alignment. The beginning of the approach on the west end of the bridge would be just east of Parkwood Street. The west approach would block access to Highway 14 from the short street between Parkwood and South Washington and from East Sioux. The east approach would bloc access from Wells Avenue, North Washington, and North Adam with the beginning of the east approach just west of North Jefferson. The overpass height and approach grades were taken from Chapter X, A Policy on Geometric Design of Highways and Streets, AASHTO.

Without some service streets adjacent to the overpass approaches several businesses on both the north and south sides of the tracks would be restricted or eliminated.

With the grade separation traffic between East Capitol and Highway 14 that now uses the intersection at Wells Avenue would have use North Jefferson. Traffic that now uses the East Sioux/South Washington intersection with Highway 14 would have to use the South Monroe intersection. The grade separation would eliminate an at grade access from the north side of the tracks to the hospital but would provide an unrestricted access using North Jefferson. Depending on where the emergency vehicle was coming from on the north side of the tracks this route could be about four blocks longer but would not have the possibility of being blocked by a train.


High Sch
Capitol
BROADWAY
PIERRE
Washington Sch
GRADE SEPARATION
4
DAKOTA AVE
Griffin Park
500'
0

Rochester - Broadway Grade Separation Cost Estimate

[THIS PAGE INTENTIONALLY LEFT BLANK]

Burns & McDonnell
SINCE 1898

Date: September 30, 2001

To: Steve Thornhill

From: Randy Sedlacek

Re. STB - DM&E
Project 24554
Rochester – Broadway Grade Separation Cost Estimate

Roadway Overpass:

It has been assumed the Broadway overpass would provide separation for both the main line and the siding to the south of the main line. If the overpass only provided separation for the main line the south overpass approach would interfere with the siding. The siding could possibly be relocated but that option was not considered for this estimate.

The overpass height and approach grades were taken from Chapter X, A Policy on Geometric Design of Highways and Streets, AASHTO.

The preliminary estimated cost for the Broadway overpass is $6,200,000. This cost does not include traffic control/detours for construction, utility relocation, access modifications required to existing businesses.

Roadway Underpass:

It has been assumed the Broadway underpass would provide separation for both the main line and the siding to the south of the main line. If the underpass only provided separation for the main line the south underpass approach would interfere with the siding. The siding could possibly be relocated but that option was not considered for this estimate. The cost for two railroad bridges over the roadway has been included.

The underpass height and approach grades were taken from Chapter X, A Policy on Geometric Design of Highways and Streets, AASHTO.

The preliminary estimated cost for the Broadway underpass is $6,250,000. This cost does include temporary track to maintain main line traffic during construction but does not include any temporary track for the siding. This cost does not include traffic control/detours for construction, utility relocation, access modifications required to existing businesses.

The underpass would have a much greater impact on maintaining rail service during construction. It also has a large unknown in the dewatering and associated groundwater design costs. The estimate does include a very preliminary cost estimate for a stormwater pump station. The underpass presents a possible hazard during very intense short duration rainfall events.

Burns & McDonnell
SINCE 1898

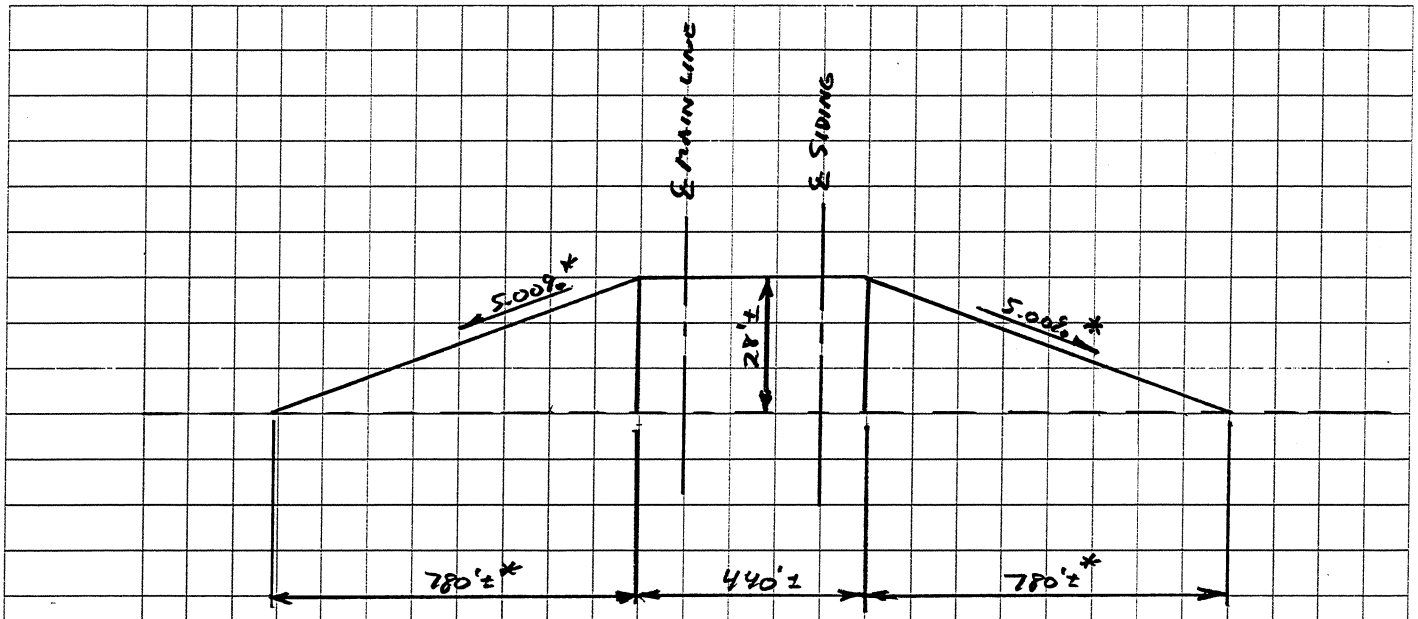
011200 Form GCO-29

Client _____ Page 1 of _____

Project 24554 Date 9/28/01 Made By SEDLACEK

ROADWAY OVERPASS AT BROADWAY Checked By _____

_____ Preliminary ✓ Final _____



* FROM FIGURE X-7A, AASHTO - A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR 37 MPH DESIGN SPEED.

ASSUME BRIDGE WIDTH IS 4 - 12' TRAFFIC LANES, 2 - 5' SIDEWALKS, AND 2 - 1' BARRIERS FOR 60'.

FROM MISSOURI DOT PRELIMINARY DESIGN GUIDELINES AVERAGE PRICE PER SQUARE FOOT OF DECK FOR PLATE GIRDER BRIDGE $65 - $85. USE $85.

$A = 440' \times 60'$

$= 26,400$ SQ FT.

COST = 26,400 SQ FT × $85/SQ FT

= $2,244,000

BRIDGE APPROACHES WILL REQUIRE RETAINING WALLS - THERE IS NO SPACE FOR FILL SIDE SLOPES. FROM MISSOURI DOT PRELIMINARY DESIGN GUIDELINES ESTIMATED COST FOR MECHANICALLY STABILIZED EARTH WALL IS $35/SQ FT.

Burns & McDonnell SINCE 1898

011200 Form GCO-29

Client _____ Page 2 of _____

Project 24554 Date 5/28/14 Made By SEDLACEK

ROADWAY OVERPASS AT BROADWAY Checked By _____

Preliminary ✓ Final _____

WORK AREA = 4(½ · 28' · 780') + 2(28' · 60')
= 43,680 SQ FT + 3,360 SQ FT
= 47,040 SQ FT

COST = 47,040 SQ FT × $35/SQ FT
= $1,646,400

WORK AREA FILL:

V = 2(½ · 28' · 780' · 60') × 1/27 CU FT/CU YD
= 48,533 CU YD

ASSUME: MATERIAL COST IS $15/CU YD
TRANSPORTATION COST IS $10/CU YD
PLACEMENT COST IS $1/CU YD
$26/CU YD

FILL COST = 48,533 CU YD × $26/CU YD
= $1,261,867

PAVEMENT: ASSUME CONCRETE 8" THICK - FROM MEANS = $24.50/SY

A = 2(780' × 48') × 1/9 SQ FT/SQ YD
= 8,320 SQ YD

COST = 8,320 SQ YD × $24.50/SQ YD
= $203,840

EXISTING PAVEMENT DEMO: ASSUME 8" REINFORCED - FROM MEANS
$110/CY W/O HAULING

DEMO = 2(780' × 48' × 8" × ½ IN/FT) 1/27 CU FT/CU YD
= 1,858 CU YD

HAULING = $15/CY
TIPPING FEE = $55/TON

COST = 1858 CU YD × $110/CU YD
= $204,380

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client _____ Page 3 of _____

Project 24554 Date 9/28/12 Made By SEDLACEK

ROADWAY OVERPASS AT BROADWAY Checked By _____

_____ Preliminary ✓ Final _____

HAULING COST = 1858 CU YD x $15/CU YD
= $27,870

TIPPING FEE = 1858 CU YD x 27 CU FT/CU YD x 155 LB/CU FT x 1/2000 LB/TON
x $55/TON
= $213,832

SUBTOTAL:	$2,244,000
	$1,646,400
	$1,261,867
	$203,840
	$204,380
	$27,870
	$213,832
	$5,802,189

ENGINEERING - $350,000

TOTAL = $6,152,189 SAY $6,200,000

THIS COST DOES NOT INCLUDE TRAFFIC CONTROL/DETOURS FOR CONSTRUCTION, UTILITY RELOCATION, ACCESS MODIFICATIONS TO EXISTING BUSINESSES, ETC.

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client _____ Page 1 of _____

Project 24554 Date 9/30/01 Made By SEDLACEK

ROADWAY UNDERPASS AT BROADWAY Checked By _____

_____ Preliminary ✓ Final _____

TEMPORARY TRACK CONSTRUCTION: L = 1000 FT.

ASSUME COST IS $250/FT. THIS INCLUDES ROAD CROSSINGS, SIGNAL LOCATION, ETC.

COST = 1000 FT x $250
= $250,000

PAVEMENT REMOVAL: FROM ROADWAY OVERPASS NOTES DATED 9/26/01

COST = $204,380 + $27,870 + $213,832
= $446,082

EXCAVATION:

$V = [2(\frac{1}{2} \times 620' \times 25') 48' + (440' \times 48' \times 25')] \frac{1}{27}$ CU FT/CU YD
= 47,111 CU YD

EXCAVATION = $2.50/CU YD
HAUL = $12.00/CU YD
TIPPING FEE = $20/TON

EXCAVATION = 47,111 CU YD x $2.50/CU YD
= $117,778

HAUL = 47,111 CU YD x $12.00/CU YD
= $565,332

TIPPING FEE = 47,111 CU YD x 27 CU FT/CU YD x 100 LB/CU FT x $\frac{1}{2000}$ LB/TON x $10/TON
= $635,998

DEWATERING: GROUNDWATER UNKNOWN. UNIT CLOSE PROXIMITY TO RIVER ASSUME SIGNIFICANT DEWATERING REQUIRED.
ASSUME COST = $100,000

RETAINING WALL: ASSUME WALL HEIGHT VARIES FROM 0' TO 25'

FROM MEANS FOR 20' HIGH W/500 LB/LF SURCHARGE
IS $780/LF ≈ $39/SQFT. USE $45/SQFT.

$A = 4\left(\frac{1}{2} \cdot 620' \cdot 25'\right) + 2(440' \times 25')$
$= 53{,}000$ SQ FT.

COST = 53,000 SQ FT × $45/SQ FT
= $2,385,000

BRIDGE: FROM CBEC BRIDGE S.U. ESTIMATE DATED 2/14/05
2 EA
STEEL = 195,000 LB FROM MEANS FOR PLATE GIRDERS
COST = $241,800 $2475/TON = $1.24/LB
PILECAP 5,400
PILING 24,000
MOBILIZE 5,000
$276,200 × 2 = $552,400

PAVEMENT: ASSUME 8" REINFORCED CONCRETE FROM MEANS -
$24.50/SQ YD

$A = [2(620' \times 48') + 440 \times 48'] \frac{1}{9}$ SQFT/SQ YD
$= 8{,}960$ SQ YD

COST = 8,960 SQ YD × $24.50
= $219,520

TEMPORARY TRACK REMOVAL: L = 1000' ASSUME COST IS $100/FT

COST = 1000' × $100/FT
= $100,000

Burns & McDonnell
SINCE 1898

011200 Form GCO-29

Client _____ Page 3 of _____

Project 24554 Date 9/30/01 Made By SEDLACEK

ROADWAY UNDERPASS AT BROADWAY Checked By _____

_____ Preliminary ✓ Final _____

100-YEAR RETURN PERIOD 1 HOUR RAINFALL IS 3.25"

SURFACE AREA = (2,620' + 440') x 48'
= 80,640 SQ FT.

RUNOFF VOLUME = 80,640 SQ FT x 3.25" x 1/12 IN/FT
= 21,840 CU FT
= 163,363.6 GALLONS → 2,723 GALLONS/MINUTE

ASSUME 2 - 3000 GPM PUMPS

FROM MEANS - 1,000 GPM W/ PREFABRICATED CONCRETE - $106,500

ASSUME STRUCTURE REQUIRED IS COST IN PLACE.
ESTIMATE COST $500,000

SUBTOTAL:	$ 250,000
	$ 446,082
	$ 117,778
	$ 565,332
	$ 635,998
	$ 100,000
	$ 2,385,000
	$ 552,400
	$ 218,520
	$ 100,000
	$ 500,000
	$ 5,872,110
ENGINEERING	$ 350,000
TOTAL:	$ 6,222,110
SAY	$ 6,250,000

THIS COST DOES NOT INCLUDE TRAFFIC CONTROL, DETOURS FOR CONSTRUCTION, UTILITY RELOCATIONS, ACCESS MODIFICATIONS TO EXISTING USERS

CostWorks 2000 - [No Active Project]

Qty	CSI Number	Description	Crew	Daily Output	Labor Hours	Unit	Bare Mat.	Bare Labor	Bare Equip.	Bare Total	Total Incl. O&P	Zip Code Prefix	Type	Release	Note
1.000	028502050500	Bridges, structural steel, built up, plate girders	E6	10.50	12.190	Ton	1,525.00	$380.00	$120.00	2,025.00	$2,475.00		Union	2000	
		Totals					**$1,525.00**	**$380.00**	**$120.00**	**2,025.00**	**$2,475.00**				

Qty	CSI Number	Description	Crew	Daily Output	Labor Hours	Unit	Bare Mat.	Bare Labor	Bare Equip.	Bare Total	Total Incl. O&P	Zip Code Prefix	Type	Release	Note
1.000	028301003200	Retaining wl, reinf conc cantilever, 20' hl, 500 LB per l.f surcharge	C17C	7.50	11.067	L.F.	$188.00	$325.00	$55.00	$568.00	$780.00		Union	2000	
		Totals					**$188.00**	**$325.00**	**$55.00**	**$568.00**	**$780.00**				

Burns & McDonnell
041593 Form GCO-29B

STRUCTURE NO 5.4 @ STA 328+25 A.K.A. SOUTH BRIDGE
A.K.A. SOUTH BRIDGE OVER MOSQUITO CREEK
TOTAL LENGTH = 263'-4"

DUE TO REALIGNMENT, THIS BRIDGE CAN BE SHORTENED BY 80' (±) LEAVE MAIN SPAN @ 80'

SAY WEST APPROACH IS 4 @ 19-4 =	77-4
EAST " IS 3 @ 19-4 =	58-0
MAIN SPAN =	80-0
	215-4
2 STEEL APPROACH @ 24-0	48-0
	263-4

vs 343-3½ (80' ± SHORTER)

80' STEEL THRU ℄ GIRDER (BASED ON ICG OVER STERLING-INDEP MO)

FLOOR BEAMS	41 W 18×55 × 16' = 41×16×55	=	36080 LB
	10 W 18×70 × 16' = 10×16×70	=	11200
DIAG BRACES	7 WT 6×32.5×20' = 7×20×32.5	=	4550
WEB ℄'s	2 @ 66" × ⅝ × 80' = 2×80×5.5×25.5	=	22440
FLANGE ℄'s	4 @ 20" × 3" × 80' = 4×80×3×1.67×40.8	=	65410
STIFFENERS	4×15×5"×⅜"×63" = 60×5.25×6.38	=	2010
CLIP L's (5×3½×⅜)	4×35-1'-3" @ 10.4 = 4×35×1.25×10.4	=	1820
" " "	2×15-1'-3 @ 10.4 2×15×1.25×10.4	=	390
CURB BOLSTERS (L 7×4×⅜)	2×51-3-6 @ = 2×51×3.5×13.6	=	4855
KNEE BRACE ℄ (½")	2×6×1.5×3× 12×1.5×3×20.4	=	1100
FLOOR ℄ (9/16)	80×11.33×(9/16 ℄) = 80×11.33×23	=	20847
CURB ℄	80×2×1.75 (9/16) 80×2×1.75×23	=	6440
			177,142 LB
ADD 10% BOLTS, WELDS, ETC			18000
			195000
		@ $.95	
		$	185,250

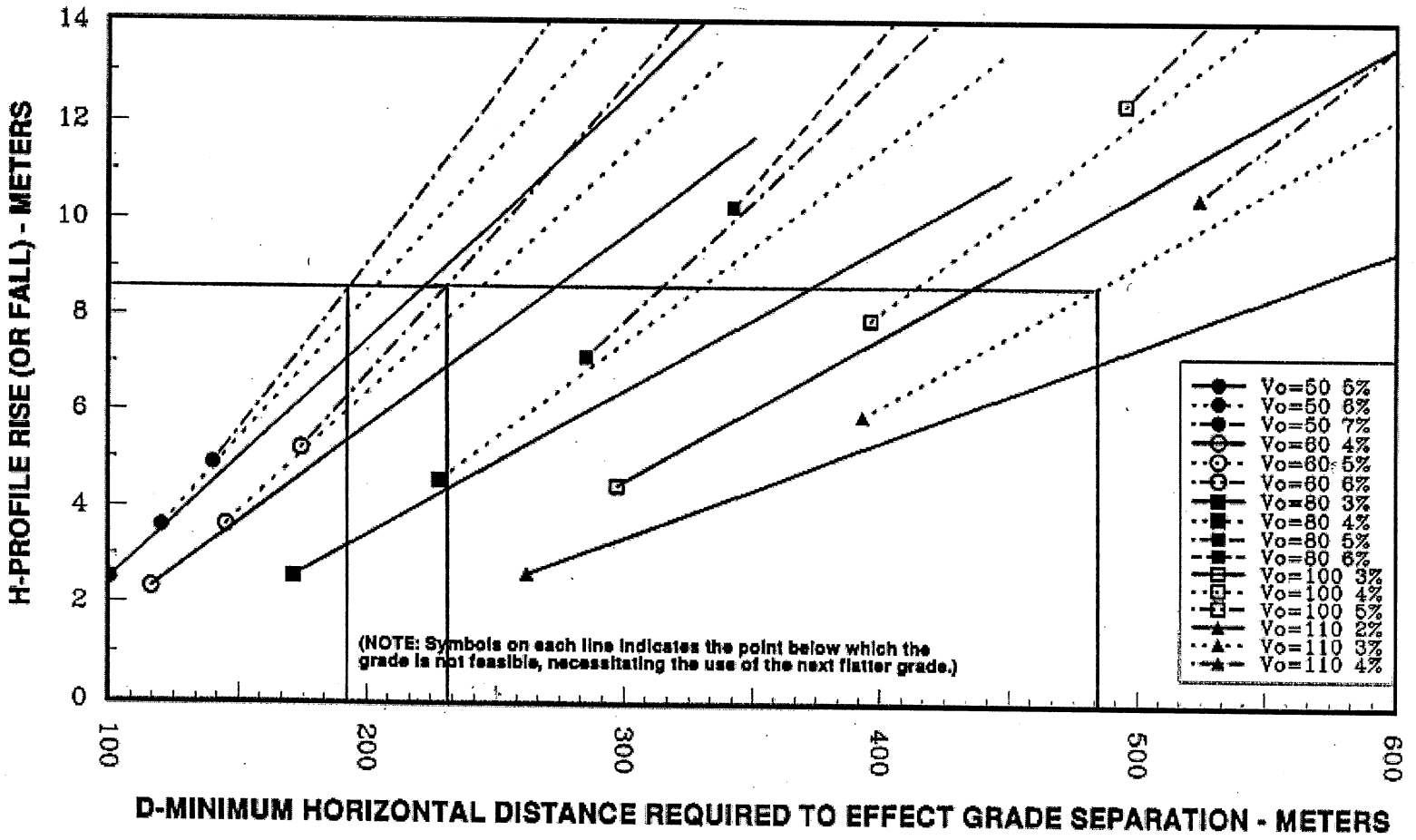
PILE CAP 2 @ 5'×3'×16' = 480 FT³ = 18 CY @ 300 → 5400

PILES BOTT @ 977 / TIP @ 930 / 47 = 2×12×40 @ 25'
→ SAY 40 FOR 16" 24000

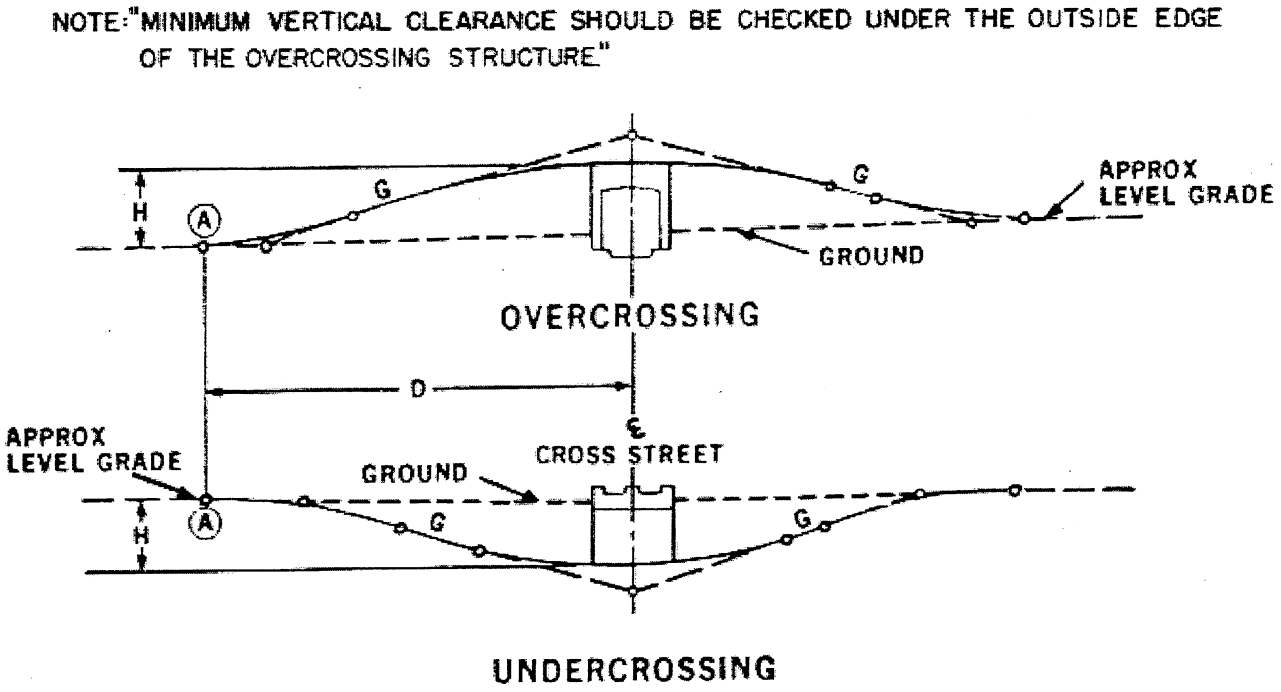
MOBILIZE PILE RIG 5000

219,650

Figure X-7A. Flat terrain, distance required to effect grade separation.

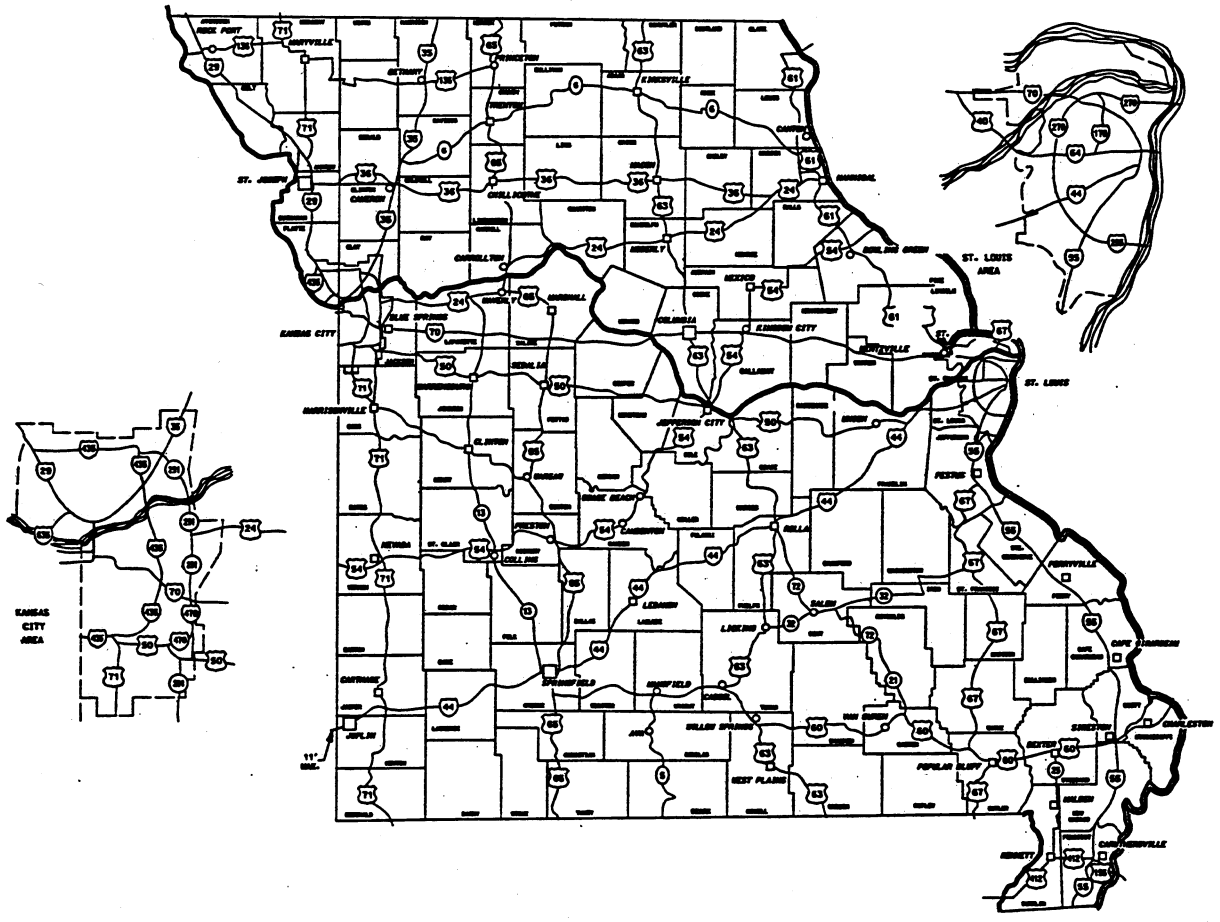


Return to Text



Return to Text

MoDOT Preliminary Design Guidelines



DRAFT
Preliminary Design Guidelines

Version 1.0
May 2000

Preliminary Design Guidelines
Table of Contents

Preliminary Cost Estimate

The Preliminary Cost Estimate should be neat, legible and dated since a copy of it is now included with the Bridge Memo. The quickest way to calculate the Preliminary Cost Estimate is to multiply the area of the bridge deck by an average cost. The average cost should be adjusted up for items such as high skews, long piles, etc. You must also then add the costs of Approach Slabs, Bridge Removals, Cofferdams, Temporary Shoring, etc.

The average costs vary. Usually they fall within these ranges.

Type of Bridge	Avg. Price/Sq. Ft. of Deck
Prestressed I-Girder	$45 - $65
Prestressed Bulb-Tee	$55 - $75
Plate Girder	$65 - $85
Temp. Bridge(state furn.)	$40 - $45
Temp. Bridge(cont. furn.)	$65 - $75
Major Lake Crossing	$150 - $175
Major River Crossing	$175 - $200

A more accurate way of calculating the Preliminary Cost Estimate is to actually calculate some approximate quantities for the bridge and then multiply them by the unit prices supplied by the average bid prices for the previous year. If you set up a spreadsheet to calculate these quantities, it only takes a couple of hours to come up with. To estimate the pounds of reinforcing steel in a structure. multiply the number of cubic yards of concrete in the structure by 115 (125 on boxes).

No matter which method you use to calculate the Preliminary Cost Estimate, increase it for the following items: (PDM Fig. 1-02.1) (do not compound the increases and use your judgement)

Item	% Increase
Staged Construction	10
Horizontally Curved	5
Seismic Performance Cat. B	10
Seismic Performance Cat. C	25
Seismic Performance Cat. D	40
Tight Site/Limited Access	3

Here are some guidelines for estimating the cost of the removal of existing bridges:

Type of Bridge Removal	Cost per Square Foot
Simple Structures Over Streams	$5
Girder Structures Over Roads	$7
Conc. Slab Structures Over Interstates (quick opening of lanes to traffic)	$25

The following pages contain prices to aid you in determining your Preliminary Cost Estimate.

	LISTING OF STANDARD BID ITEMS:	UNITS	ESTIMATED UNIT COST
	EXCAVATION		
206-10.00	CLASS 1 EXCAVATION	C.Y.	$40
206-10.03	CLASS 1 EXCAVATION IN ROCK	C.Y.	$100
206-20.00	CLASS 2 EXCAVATION	C.Y.	$70
206-20.03	CLASS 2 EXCAVATION IN ROCK	C.Y.	$120
206-30.00	CLASS 3 EXCAVATION	C.Y.	$20
206-30.00	CLASS 3 EXCAVATION IN ROCK	C.Y.	$60
206-45.00	SELECTED GRANULAR BACKFILL	C.Y.	$30
	PILING/DRILLED SHAFTS/ROCK SOCKETS		
206-50.00	SHEET PILING	SQ. FT.	$10
702-10.10	STRUCTURAL STEEL PILES - 10"	LIN. FT.	$27
702-10.12	STRUCTURAL STEEL PILES - 12"	LIN. FT.	$30
702-10.14	STRUCTURAL STEEL PILES - 14"	LIN. FT.	$35
702-11.00	CAST-IN-PLACE CONCRETE PILES - 14"	LIN. FT.	$30
702-11.00	CAST-IN-PLACE CONCRETE PILES - 20"	LIN. FT.	$40
702-11.00	CAST-IN-PLACE CONCRETE PILES - 24"	LIN. FT.	$50
702-60.00	PRE-BORE FOR PILING	LIN. FT.	$35
702-70.00	PILE POINT REINFORCEMENT	EACH	$100
701-11.00	DRILLED SHAFT (3' THRU 6' DIAMETER)	LIN. FT.	$800
701-11.00	DRILLED SHAFT (6' THRU 7' DIAMETER)	LIN. FT.	$1,100
701-11.00	ROCK SOCKET (3' THRU 6' DIAMETER)	LIN. FT.	$1,300
701-11.00	ROCK SOCKET (6' THRU 7' DIAMETER)	LIN. FT.	$2,100
	CONCRETE		
503-10.10	BRIDGE APPROACH SLAB	SQ. YD.	$140
703-20.00	CLASS B CONCRETE (CULVERTS-BRIDGE)	C.Y.	$300
703-20.03	CLASS B CONCRETE (SUBSTR)	C.Y.	$400
703-20.09	CLASS B CONCRETE (RETAINING WALLS)	C.Y.	$350
703-20.25	DEADMAN ANCHORAGE ASSEMBLY	EACH	$15,000
703-30.01	SEAL CONCRETE	C.Y.	$140
703-40.03	CLASS B-1 CONCRETE (CULVERTS-BRIDGE)	C.Y.	$450
703-42.02	CLASS B-2 CONCRETE (SUPSTR ON STEEL AND CONC)	C.Y.	$600
703-42.05	CLASS B-2 CONCRETE (SUPSTR VOIDED SLABS)	C.Y.	$600
703-42.12	SLAB ON STEEL (with precast panels)	SQ. YD.	$140
703-42.12	SLAB ON STEEL (withOUT precast panels)	SQ. YD.	$200
703-42.13	SLAB ON CONCRETE I GIRDER (with precast panels)	SQ. YD.	$140
703-42.13	SLAB ON CONCRETE I GIRDER (withOUT precast panels)	SQ. YD.	$200
703-42.15	SAFETY BARRIER CURB	LIN. FT.	$60
703-42.20	SLAB ON SEMI - DEEP ABUTMENT	SQ. YD.	$175
703-44.10	MEDIAN BARRIER CURB	LIN. FT.	$60
703-44.30	SIDEWALK (BRIDGES)	SQ. FT.	$20
	REPAIR WORK		
202-30.07	SEAL COAT REMOVAL (BRIDGES)	SQ. FT.	$1.00
202-30.08	ASPHALT REMOVAL (BRIDGES)	SQ. FT.	$1.50
202-30.00	REMOVAL OF EXISTING BRIDGE DECK - OVER ROADWAY	SQ. FT.	$7.00
202-30.00	REMOVAL OF EXISTING BRIDGE DECK - OVER STREAM	SQ. FT.	$6.50
703-50.10	REPAIRING CONCRETE DECK (HALF-SOLING)	SQ. FT.	$35
703-50.20	FULL DEPTH REPAIR	SQ. FT.	$50
703-50.30	SLAB EDGE REPAIR (BRIDGES)	LIN. FT.	$100
703-50.40	MODIFIED DECK REPAIR	SQ. FT.	$40
703-20.20	SUBSTRUCTURE REPAIR (FORMED)	SQ. FT.	$125
703-20.21	SUBSTRUCTURE REPAIR (UNFORMED)	SQ. FT.	$125
703-20.22	SUPERSTRUCTURE REPAIR (UNFORMED)	SQ. FT.	$125

	LISTING OF STANDARD BID ITEMS:	UNITS	ESTIMATED UNIT COST
	PRESTRESSED CONCRETE GIRDERS		
705-11.40	PRESTRESSED CONCRETE I-GIRDER - (40' THRU 69' SPAN)	LIN. FT.	$85
705-11.70	PRESTRESSED CONCRETE I-GIRDER - (70' THRU 90' SPAN)	LIN. FT.	$90
705-11.__	PRESTRESSED CONCRETE I-GIRDER - (OVER 90' SPAN)	LIN. FT.	$100
705-16.XX	PRESTRESSED CONCRETE BULB TEE GIRDER - (75' THRU 99' SPAN)	LIN. FT.	$110
705-16.XX	PRESTRESSED CONCRETE BULB TEE GIRDER - (100' THRU 130' SPA	LIN. FT.	$120
705-20.30	PRESTRESSED CONCRETE DOUBLE TEE GIRDER	LIN. FT.	$95
	REINFORCING		
706-10.20	REINFORCING STEEL (CULVERTS-BRIDGE)	LB.	$0.75
706-10.40	REINFORCING STEEL (RETAINING WALL)	LB.	$0.65
706-10.60	REINFORCING STEEL (BRIDGES)	LB.	$0.70
706-10.70	MECHANICAL BAR SPLICE	EACH	$35
710-10.00	REINFORCING STEEL (EPOXY COATED)	LB.	$0.95
	(AN AVERAGE OF 120# REINF STEEL/CU YD OF CONCRETE CAN BE ASSUMED)		
	FABRICATED STRUCTURAL STEEL		
712-10.10	FAB. STRUCTURAL STEEL (A709 Grade 36 or 50) *	LB.	$1.20
712-11.13	FAB. STRUCTURAL WEATHERING STEEL (A70 Grade 50W) *	LB.	$1.20
	* (ADD $0.10/LB. FOR CURVED GIRDERS)		
	DRAINS		
712-36.10	SLAB DRAIN	EACH	$175
712-36.50	VERTICAL DRAIN AT END BENTS (NORMAL WIDTH, LOW SKEW)	EACH	$1,200
	BRIDGE RAIL		
202-10.51	REMOVAL AND STORAGE OF EXISTING BRIDGE RAIL	LIN. FT.	$7
713-40.00	BRIDGE GUARD RAIL (THRIE BEAM)	LIN. FT.	$135
	BRIDGE DECK OVERLAY		
403-10.50	ALTERNATE ASPHALTIC CONCRETE WEARING SURFACE	SQ. YD.	$18
409-10.10	POLYMER MODIFIED ASPHALT (SEAL COAT)	GAL.	$8
409-20.92	COVER AGGREGATE	TON	$90
703-70.26	POLYMER CONCRETE OVERLAY	SQ. YD.	$40
703-70.28	LATEX CONCRETE WEARING SURFACE	SQ. YD.	$50
703-70.29	LOW SLUMP CONCRETE WEARING SURFACE (W/ SCARIFYING)	SQ. YD.	$40
707-10.40	CATHODIC PROTECTION SYSTEM	SQ. FT.	$10
	PAINTING		
712-52.00	SURFACE PREPARATION FOR RECOATING STRUCTURAL STEEL	SQ. FT.	$3.00
712-52.10	FIELD APPLICATION OF INORGANIC ZINC PRIMER	SQ. FT.	$2.75
712-54.00	FIELD COAT (SYSTEM G) BROWN	SQ. FT.	$1.75
712-54.10	FIELD COAT (SYSTEM G) GRAY	SQ. FT.	$1.75
	CONCRETE REMOVAL		
	REMOVAL OF WINGS	EACH	$5,000
202-10.52	CURB REMOVAL (BRIDGES)	LIN. FT.	$60
202-10.53	CURB REMOVAL FOR THRIE BEAM INSTALLATION	LIN. FT.	$60
202-10.55	PARTIAL REMOVAL OF SUBSTRUCTURE CONCRETE	C.Y.	$2,500

	LISTING OF STANDARD BID ITEMS:	UNITS	ESTIMATED UNIT COST
	EXPANSION DEVICES		
202-10.54	REPLACEMENT OF EXPANSION DEVICE AND ADJACENT CONCRETE	LIN. FT.	$250
703-82.__	PREFORMED COMPRESSION EXPANSION JOINT SEAL	LIN. FT.	$275
703-85.00	STRIP SEAL EXPANSION DEVICE	LIN. FT.	$250
712-30.00	STEEL BAR DAM	EACH	$2,500
712-09.00	EXPANSION DEVICE (FINGER PLATE) (with gutter)	LIN. FT.	$900
712-09.00	EXPANSION DEVICE (FINGER PLATE) (withOUT gutter)	LIN. FT.	$650
	BEARINGS		
703-70.30	PLAIN NEOPRENE BEARING PAD	EACH	$75
703-71.45	LAMINATED NEOPRENE BEARING PAD	EACH	$100
703-71.50	LAMINATED NEOPRENE BEARING PAD (TAPERED)	EACH	$175
703-71.60	LAMINATED NEOPRENE BEARING PAD (STEEL STRUCTURES)	EACH	$1,200
703-72.50	TYPE N PTFE BEARING	EACH	$1,300
	MISCELLANEOUS		
703-20.10	MECHANICALLY STABILIZED EARTH WALL (CONC. FACE PANELS)	SQ. FT.	$35
607-10.66	(72 IN.) PEDESTRIAN FENCE	LIN. FT.	$50
607-10.67	(112 IN.) CURVED TOP PEDESTRIAN FENCE	LIN. FT.	$65
	MAKE END BENT INTEGRAL (FOR NORMAL- WIDTH BRIDGE)	EACH	$10,000
	COFFERDAMS (MAJOR RIVER)	SQ. FT.	$25
	COFFERDAMS (SMALLER STREAMS)	SQ. FT.	$7

[THIS PAGE INTENTIONALLY LEFT BLANK]